

# Who Would've Known? Seasonally Recurring Giant Eddy Seen Off California

Remember the fascinating double-gyre structure Jeff Paduan discovered off Monterey Bay 15 years ago from SeaSonde current maps? A bit over a year ago, Greg Crawford and Shannon Stone (of Humboldt State); Chris Halle and John Largier (of Bodega Marine Laboratory) found a giant eddy lurking off Mendocino with their recently installed Long-Range SeaSonde at Shelter Cove, combined with the unit at Pt. Arena. This eddy, they determined, was produced by the NNW winds that drive upwelling off the coast during August - October every year. It is a regular visitor during this period.

As the resulting cold-water jet, up to 2 knots near the coast, flows to the South, it becomes an anticyclonic eddy that has a mammoth diameter up to 170 km. Entraining warmer water in its center, shown by the lighter color in these consecutive figures the colder coastal waters are swept offshore around its Southern edge. Although the example here was seen in 2008, we can attest that this same huge eddy was the most prominent eye-catching feature seen in the zoomed-out West-Coast HFR Net data during the same period in 2009.

These long-range radars are part of the COCMP network that now comprises 60 SeaSondes covering the State of California. Many of the radars are shorter-range, higher-resolution units centered around populated areas and bays. But the long-range systems span the shelf, and when combined with satellite observations like temperature, reveal fascinating dynamics that impact biological fisheries productivity we depend on along our West Coast. As the upwelling winds die (wind shown as the red arrow), this fascinating feature disappears, and a relaxation phase with weak Northerly flows dominates near the coast the remainder of the year.

The authors of the AGU presentation in which this discovery was displayed used animations they called “particle backtracking” from the SeaSonde current maps to determine the origins of the water from a grid of points within the eddy. This type of analysis reveals the surface water pathways and length of time it takes floating particles to traverse the region. The figures below are from that presentation.

